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THE SPECIES OF EUPARYPHUS RELATED TO CROTCHII O. S.

(Diptera, Stratiomyidæ)

BY MAURICE T. JAMES

Colorado State College, Fort Collins

The genus *Euparyphus* has reached its highest development in the southwestern part of the United States, the related *Oxycera* replacing it to a large extent in the eastern states and in Europe. Along with this development, there occurs what seems to be a natural group of species which is restricted to the Rocky Mountain and Pacific Coast region of British Columbia, the United States, and Mexico. These species should not be separated generically from typical *Euparyphus*, but since they form a well defined section of the genus, I am designating this as—

Caloparyphus James, new subgenus

This subgenus includes comparatively large species, 8 mm. or more in length (except *tahoensis* Coq. and *crucigerus* Coq., which measure somewhat less); scutellar spines separated, at base, by a distance at least as great as, usually much greater than, length of spines; thorax black, with four longitudinal yellow vittæ; head yellow with black markings (predominantly black in *obliquus*), and abdomen black, with conspicuous arcuate lateral marking or a once-interrupted arcuate band each on segments three and four (*decem-maculatus* O. S. varies from this pattern). Eyes pilose or bare.

Type, *Oxycera crotchii* O. S.

Ten species are here referred to this subgenus. Of these, *E. decem-maculatus* is unknown to me and has been placed here on the basis of its description. Two lines along which speciation has taken place are in the antennal structure and the abdominal pattern. (1) The antennæ, in one group of species (*amplus*, *currani*, *crucigerus* and *tahoensis*), have been shortened, especially in respect to the terminal two segments (seventh and eighth), whereas, in a second group, the antennæ remain long.

(2) The basic abdominal pattern apparently consists of yellow markings on a black background, in the form of large spots at the base of the first and apex of the fifth, and more or less arcuate bands on the second, third, and fourth, segments. The bands are doubly interrupted in *decem-maculatus*, once so in the other species; the yellow areas furthermore tend to become reduced in size, or to disappear completely, the extreme melanic condition being reached in *tahoensis*, typical form. On this basis, three species groups might be recognized:

- (a) Abdominal bands twice interrupted—*decem-maculatus*.
- (b) Abdominal bands once interrupted; antennæ shortened—*amplus*, *currani*, *crucigerus*, *tahoensis*.
- (c) Abdominal bands once interrupted; antennæ not shortened—*mariposa*, *pretiosa**, *crotchii*, *major*, *flaviventris*.

I am indebted to Messrs. G. E. Shewell, J. N. Knull, and Charles T. Green for information regarding the Curran, Hine, and Coquillett types, respectively.

The valid species may be separated by means of the following key.

1. Abdominal segments three to five each with an isolated median yellow spot; these, together with three lateral spots on each side and an apical one, make a total of ten abdominal spots.....*decem-maculatus* O. S.
- Abdomen with at most eight yellow spots, and without the median ones on the segments..... 2
2. Antennæ no longer than head; terminal segment (eighth) definitely shorter than first and second combined; seventh segment not more than half the length of either third, fourth, or fifth 3
- Antennæ at least one and one-half times length of head; terminal segment (eighth) at least as long as combined length of first and second; seventh segment at least as long as fourth or fifth..... 6
3. Vein R_4 normally wanting; femora black; antennæ with at most one segment yellowish, frequently entirely black..... 4
- Vein R_4 normally present; femora yellow; antennæ extensively yellow basally, at least second and third segments entirely yellow*amplus*

**E. pretiosa* presumably belongs here. Only the first and second antennal segments are present in the type, the only specimen of this species known.

4. Larger species (8 mm.); venter entirely black; face of female with a median, inverted, U-shaped, black marking, but otherwise yellow *currani*
- Smaller species (6-7 mm.), venter more or less extensively yellow at middle; face of female with a median, inverted, V-shaped, black marking and a longitudinal black spot on each side of it, the spots sometimes connected with each other.... 5
5. Front (♀) black, with an oblique spot on each side near middle, yellow *tahoensis*
- Front in large part yellow..... *crucigerus*
6. Femora entirely yellow..... 7
- Femora in part black..... 8
7. First and second antennal segments yellow; frontal black band continuous with black of face..... *mariposa*
- First and second antennal segments black; black frontal band ending at antennæ..... *pretiosa**
8. Mid-dorsal yellow stripes ending at or before suture; arcuate bands of third abdominal segment separated by a distance much greater than their length; sixth and seventh antennal segments subequal, eighth greatly elongated..... *crotchii*
- Mid-dorsal yellow stripes extending beyond suture; arcuate bands of third and fourth abdominal segments closely approaching each other, almost contiguous; sixth antennal segment much longer than seventh..... 9
9. Venter black, segments marked at middle with yellow.... *major*
- Venter yellow, segments sometimes black on anterior margin *flaviventris*

EUPARYPHUS (CALOPARYPHUS) DECEM-MACULATUS O. S.

Euparyphus decem-maculatus Osten Sacken, Biol. Centr.-Amer., Dipt., 1:40, 1886.

Only the male type, from northern Sonora, Mexico, is known. The abdominal pattern is characteristic. The type may be lost. Mr. H. Oldroyd says he cannot find it in the British Museum, where the other *Biologia* types are.

EUPARYPHUS (CALOPARYPHUS) AMPLUS Coquillett

Euparyphus amplus Coquillett, Proc. U. S. Nat. Mus., 25:100, 1902.

Female (previously undescribed). Head yellow; the entire vertex, however, black, together with a prominent marking on front and face which takes somewhat the form of an inverted Y; stem of Y extending from vertex along mid-frontal line to a point somewhat above base of antennæ, where it divides, one fork extending

*See footnote page 50.

along each side of antennæ and to oral margin; from this Y, above antennæ, an angular prominence extends on each side toward the eyes; narrow ocular orbits above antennæ more or less extensively black; cheeks black; oral margin more or less blackish within. Proboscis yellow. First antennal segment black, its apex yellow; second yellow; third, fourth, and fifth entirely yellow, or grading from yellow at base of third to brown on fifth; sixth to eighth black; comparative length of the eight segments, 6:8:8:7:7:11:2:11; entire antenna somewhat shorter than head, as seen from the side. Pile of head yellow, inconspicuous except on proboscis; occipital orbit silvery below. Eyes bare. Thorax black, except the following areas which are yellow: a pair of dorsal stripes which extend almost from anterior margin to a point more than half way from suture to scutellum; humeri and broad lateral stripes extending to wing bases; post-alar calluses and a contiguous triangle pointing in an anterior direction; scutellum, except its narrow base and extreme apices of spines; the larger part of propleura; and a large area comprising narrow upper and broad posterior margins of mesopleura, upper part of sternopleura, and extensive areas on pteropleura, hypopleura, and metapleura. Halteres greenish, stems somewhat infuscated. Legs yellow, at most slightly brownish yellow on femora. Wings hyaline; veins yellow. Vein R_4 present; first posterior vein shortened to a stump, the other posterior veins not reaching wing margin. Abdomen black; first segment more or less yellowish basally; second with a small semi-circular yellow spot on each side; third and fourth each with an arcuate yellow cross-band, more or less broadly interrupted at middle, but length of yellow half-bands much greater than the distance separating them; narrow lateral margins of second to fifth segments, and apical third of fifth, yellow. Venter yellow; narrow bases of segments black. Length, 8 mm.

Described from five females, Spanish Fork, Utah (D. Elmo Hardy); one female, Hooper, Utah, June 30, 1937 (D. Elmo Hardy). The holotype, a male from Chimney Gulch, Colorado, is in the United States National Museum.

Euparyphus (*Caloparyphus*) *currani* James, new species

Female. Head yellow; vertex, a broad frontal band, middle of face and oral margin, and cheeks black; frontal band half as broad as front and ending angularly just above antennæ; black area of face taking the form of an inverted U. Proboscis yellow. Antennæ black, second segment somewhat yellowish; ratio of segments, 7:8:8:7:7:9:3:10. Pile of head yellow, inconspicuous except on proboscis; occipital orbits silvery pollinose below. Eyes

with short, scattered pile. Thorax black except the following areas, which are yellow: two longitudinal dorsal stripes which extend from anterior margin to a point half-way between suture and scutellum; humeri and a lateral stripe extending from each humerus to suture; postalar calluses and a contiguous triangle, directed forward; scutellum and its spines; upper margins of mesopleura, broadened at wing bases; and four small spots, one on each sternopleuron and pteropleuron. Halteres yellow, their stalks infuscated. Legs yellow, except basal half of each femur and a small median ring on each hind tibia, which are brownish-black. Wings hyaline, veins yellow. Vein R_4 wanting; posterior veins not reaching wing margin, and first posterior reduced to a fold beyond its base. Abdomen black; a small yellow spot at base of first segment, and one on each lateral margin of second; segments three and four each with narrowly interrupted arcuate yellow bands; narrow lateral margins of all segments but first and a large, semi-circular spot covering approximately apical half of fifth segment, yellow. Length, 8 mm.

Holotype, female, Riding Mountains, Manitoba, July 21 (J. B. Wallis), in the American Museum of Natural History.

EUPARYPHUS (CALOPARYPHUS) TAHOENSIS Coq.

Euparyphus tahoensis Coquilett, Proc. U. S. Nat. Mus., 25:98, 1902.

A black species; the female with a pair of oblique yellow markings at middle of front near the eyes and another pair on lower part of face; a male, which I refer to this species, with frontal triangle yellow and face entirely black. Thoracic markings characteristic of the group.

E. obliquus Hine probably should not be considered specifically distinct. I therefore propose the following subspecific designations:

E. tahoensis tahoensis Coq., loc. cit. Abdomen black, with the margin and an interrupted fascia on the fourth abdominal segment yellow. Type, female, Lake Tahoe, California, in the United States National Museum. Also a male, Summit Prairie, Oregon, August 3, 1935 (Joe Schuh).

E. tahoensis obliquus Hine, Can. Ent., 36: 87, 1904. Abdomen black, with the margin, a small lateral spot on the second segment, and an interrupted fascia each on the third and fourth segments, yellow. Type, Vernon, B. C., in the Ohio State University collection.

EUPARYPHUS (CALOPARYPHUS) CRUCIGERUS Coq.

Euparyphus crucigerus Coquillett, Proc. U. S. Nat. Mus., 25: 99, 1902.

Euparyphus nicolensis Curran, Trans. Royal Soc. Canada, Sect. V: 221, 1927.

A black species, close to *tahoensis*; indeed, I should consider it a subspecies, were it not for the different basic pattern of the pale markings of the head.

Crucigerus with occipital, facial, and frontal orbits yellow, and with a subquadrate spot at base of antennæ which may be confluent with the frontal and facial orbits above and connected below by means of oblique markings with lower part of facial orbits. Thoracic markings typical; abdomen with margins, sometimes base of first segment, and an interrupted vitta each on third and fourth segments yellow.

The presence of the yellow V on the face, by which Curran distinguished *nicolensis*, does not, according to the series of specimens before me, seem to be even of subspecific value.

Type, a female from Colorado, in the United States National Museum.

Distribution. South Dakota: Custer, July 17, 1924. Colorado: Fort Collins, July 24 and 31, 1895 (C. P. Gillette); Florissant, June 21, 1937 (M. T. and H. B. James). Utah: Summit, June, 1926 (Brown); Amalga, June 19, 1937 (C. F. Smith). Washington: Longmire, Rainier Nat. Park, July 27, 1920 (E. C. Van Dyke). Oregon: Wallowa Mts., Baker County, July 4, 1922 (Van Dyke). California: Buck Creek, Modoc County, June 21, 1932 (C. L. Fox); Meadow Valley, Plumas County, 4000-5000 feet (Van Dyke). Arizona: McNary, June 14, 1934 (M. T. and H. B. James). The type of *nicolensis* is from Nicola, B. C.

Euparyphus (*Caloparyphus*) *mariposa* James, new species

Female. Head black in ground color, but actually in large part yellow, the yellow areas including: occipital, facial, and frontal orbits, the last two being very broad; an inverted, U-shaped area on face, connected below with orbits and above with a small area at base of antennæ; a small triangle above antennæ; and, in the holotype, a small, U-shaped marking extending from each posterior ocellus backward onto occiput. Pile of face sparse, yellow, that of front and vertex black and denser, especially dense on black areas; all the pile, however, short. First and

second antennal segments reddish yellow, the others black; ratio of the segments, 14:13:10:7:8:18:12:42; antennæ one and three-fourth times as long as head. Eyes with short, scattered pile. Thorax with four dorsal yellow vittæ; median pair extending more than halfway from suture to scutellum; lateral pair broadly interrupted behind suture; upper margin of mesonotum bordered very narrowly with yellow, the border expanding, however, into a large area just anterior to wing base, which, in turn, extends onto sternopleuron, pteropleuron, and metapleuron, thus surrounding wing base in the form of a semi-circular band; a prominent yellow spot on each propleuron. Scutellum yellow, narrowly black at base; spines separated by a distance equal to one and one-third times the length of each. Pile of thorax light yellow. Legs yellow, the anterior coxæ black basally, posterior ones slightly brownish. Wings hyaline; veins yellow; R_4 distinctly present. Abdomen black; most of median half of first segment, apical half of fifth, an arcuate lateral marking on each side of second, broadly interrupted arcuate bands on third and fourth, and venter, yellow. Length, 9 mm.

Holotype, female, Mariposa County, Calif., W. M. Wheeler collection, in the American Museum of Natural History.

Paratype, female, Mariposa County, Calif., June 6, 1914 (F. W. Nunenmacher), in the Oregon State College collection.

EUPARYPHUS (CALOPARYPHUS) PRETIOSA Banks

Euparyphus pretiosa Banks, Can. Ent., 51: 65, 1920.

Only the type, a female from Vancouver, B. C., is known. The eyes are pilose; the antennæ are broken off beyond the second segment. Type in the Museum of Comparative Zoology.

EUPARYPHUS (CALOPARYPHUS) CROTCHII (O. S.)

Oxycera crotchii Osten Sacken, West. Dipt., Bull. U. S. Geol. Geog. Surv. Terr., 3: 212, 1877.

Euparyphus septem-maculatus Adams, Kans. Univ. Sci. Bull., 2: 31, 1903 (Synonymy, Banks, Can. Ent., 51: 65, 1920).

The antennæ are broken off beyond the second segment in the type, and this fact was responsible for Osten Sacken's generic reference, quite a natural mistake, as *Euparyphus* and *Oxycera* are indistinguishable except by the antennal structure. Fort Collins specimens in my collection have the following ratio of the antennal segments: 15:10:9:8:7:15:15:40. Type, a female from California, in the Museum of Comparative Zoology.

Distribution. Colorado: Masonville, September 6, 1934; Fort Collins, April 8, 1910 (reared specimens). Washington: Quillene, July 21, 1935 (W. Baker); Shelton, August 31, 1935 (Baker). California: Paraiso Springs, May 7, 1922 (L. S. Slevin); Inverness, August 14, 1910 (Van Dyke); Carmel, Monterey County, February 5, 1917 (Van Dyke) and May 13, 1919 (L. S. Slevin); Jewell Station, Marin County, July 15 (C. L. Fox); Geysers, 1750 feet, May 21, 1897 (W. M. Wheeler). The type of *septem-maculatus*, a male, is from Palo Alto, California. Curran has recorded this species from Vancouver, B. C.

EUPARYPHUS (CALOPARYPHUS) MAJOR Hine

Euparyphus major Hine, Ohio Nat. 1: 112, 1901.

Euparyphus octomaculatus Curran, Trans. Royal Soc. Canada, Sect. V: 222, 1927.

The above species seem to be absolutely synonymous. *E. major* was omitted from Aldrich's Catalogue, and for that reason may have been overlooked by Curran. The type of *major*, from Boulder, Colorado, is in the Ohio State University collection; that of *octomaculatus*, from Penticton, B. C., is in the Canadian National collection.

Distribution. Kansas: Atchison County, July 7, 1924 (E. P. Breakey). Colorado: Boulder, type: North Park, August 30, 1899; Masonville, September 4, 1934; Pingree Park, August 24, 1923 (R. C. Smith). Wyoming: Yellowstone Park, July 20, 1925 (A. A. Nichol). Montana: Anaconda, July 21, 1931 (J. Nottingham). Utah: Provo Canyon (D. Elmo Hardy). Washington: Mt. Rainier, August 10, 1935 (W. R. Camp); Green River Gorge, August 6, 1932 (Baker). Oregon: Horseshoe Lake, Blue Mts., 7500 feet, July 26, 1929 (Scullen); Woodruff Meadows, Jackson County, August 4, 1932 (Chamberlin). California: Los Gatos, September 25, 1910.

EUPARYPHUS (CALOPARYPHUS) FLAVIVENTRIS James

Euparyphus flaviventris James, Pan-Pac. Ent., 12: 89, 1936.

The type series is from Lake City (holotype), Buck Creek, and Davis Creek, in Modoc County, and Grass Lake, Tahoe, California. Type in the California Academy of Sciences. A specimen in the American Museum of Natural History is from Mariposa County, California, June 6, 1914 (F. W. Nunenmacher).

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A NEW FIJIAN OROCHLESIS

(Coleoptera, Curculionidae)

BY ELWOOD C. ZIMMERMAN

Bernice P. Bishop Museum, Honolulu, T. H.

The cryptorhynchine genus *Orochlesis* Pascoe, 1873, although distributed from Malaya to the Society Islands, has more than a third of its described species in Fiji. Considerable speciation has taken place in Fiji, and many new species are yet to be described. The following new species is the eighth from Fiji.

My key to the Fijian species (Occasional Papers, B. P. Bishop Museum, Vol. 12, No. 22, 1936) can be amended to include this species by changing the 4 in dichotomy 3 to 3a and inserting the following lines after dichotomy 3:

- 3a. Interocular area not narrowed dorsally, but slightly widened toward the tops of the eyes; a black species.....*ater*
 Interocular area conspicuously narrowing from the base of the rostrum to the tops of the eyes..... 4

Orochlesis ater Zimmerman, n. sp.

Derm shiny black, with the antennæ and tarsi diluted with red; head normally with pale scaling; scales on the pronotum mostly black, but normally with pale scales on either side of the median line and before elytral intervals four and five and with a few scattered pale scales, scales in front of elytral interval three black; elytral scaling black, tessellated with small patches of yellowish brown scales, each interval picked out with rather widely spaced, usually white setæ; pale or white setæ predominating on the legs; scaling on the pleura and below white excepting occasional dark scales or setæ on the fifth ventrite.

Head coarsely, deeply, rather irregularly punctate; interocular area widened instead of narrowed dorsally; scaling sparse, mostly setiform and with only a few elongate-oval scales. Rostrum coarsely punctate only at the extreme base and laterally sulcate to the antennæ, otherwise smooth and shiny, sparsely and minutely punctate. Antennæ with the scape as long as the first four funicular segments; first and second funicular segments subequal in length, the second as long as three plus four plus half of five, three to seven successively slightly more transverse and these combined as long as the club. Prothorax seven-tenths as long as broad, base bisinuate, broadly rounded on the sides to just before

the apex and there with a rather shallow but distinct subapical constriction which is just perceptibly flatly impressed across the dorsum; dorsum otherwise evenly convex; very coarsely, closely, reticulately punctate, the interstices shiny, much narrower than the diameters of the punctures; scaling sparse, not hiding the derm, without round scales, each puncture giving rise to a narrow, elongate, setiform prostrate scale, with a few scattered broader scales near the base. Elytra rather tumid in dorsal and lateral outline, almost evenly arcuate on the sides from the sinuous base to the apex, about two-thirds as broad as long and about three times as long as the prothorax; intervals, at least in the basal half, with small, low, but conspicuous, bare, shiny tubercles and a row of almost prostrate setæ; scaling, except on the tubercles, dense and concealing the derm on the intervals, the scales small; striæ at most shallowly impressed, but with the punctures large, deep and coarse near the base, well spaced, dwindling rapidly in size caudad. Legs with the femora edentate, coarsely punctate, scales sparse above, tibiæ with three carinæ on the outer face in addition to the dorsal and ventral carinæ. Sternum with the mesosternal receptacle strongly and conspicuously protuberant; metasternum deeply impressed immediately in back of the mesosternal receptacle, with large subfovea-form punctures, the hind margin rather deeply emarginate, the narrowest point between the mid and hind coxæ somewhat narrower than a hind coxa. Venter with the first two ventrites with well-defined punctures bearing prostrate squamæ or squamiform setæ, the punctures coarse near the base of the first ventrite; ventrites three and four punctate across their entire lengths; ventrite five densely punctate. Length, 4-6 mm.; breadth, 2.5-3.5 mm.

Fiji: Viti Levu and Taveuni. Holotype collected at light at Korovou, Tailevu, Viti Levu November 9, 1937, by Dr. J. M. Valentine, stored in Bernice P. Bishop Museum, and two paratypes collected at Waiyevo, Taveuni, by Dr. H. S. Evans, one February 29, 1924 (No. 701-11-23) to be deposited in the British Museum, the other March 1, 1924 (No. 793-24) in Bishop Museum.

The first abdominal segment is flattened and impressed in all three specimens, and I therefore consider them males.

The shape of the interocular area which is not narrowed from the base of the rostrum to the top of the eyes, together with the strongly protuberant mesosternal receptacle and sparsely squamose, coarsely punctate pronotum will easily distinguish this species from the other Fijian species.

BEES RELATED TO DIADASIA AUSTRALIS CRESSON

BY T. D. A. COCKERELL

Boulder, Colorado

When collecting bees on Santa Catalina Island in June, San Clemente Island from June 17 to 21, San Nicolas Island July 7 to 17, and Santa Cruz Island August 20, I found *Diadasia* visiting the flowers of *Opuntia littoralis* (Engelm.). On Santa Catalina Island in March and April and again August 29 to September 2, and on San Miguel Island early in May I found no *Diadasia*. At the time of the last visit to Santa Catalina there were plenty of *Opuntia* flowers, freely visited by *Bombus*, but not a *Diadasia* could be found.

On sorting out the numerous specimens I found I had two very distinct species:

(1). *Diadasia opuntiæ* (Cockerell), described in 1901 from San Pedro, California, as *D. rinconis opuntiæ*. From the mainland I have it only from San Pedro, but Timberlake has taken it at Whittier and Long Beach, though he never finds it inland in the region about Riverside. It is recognizable in both sexes by the shining area of metathorax, in the female by the broad abdominal bands, but especially by the hind basitarsi of the male having a circular plate at the end, instead of the finger-like process of all the other species of the *D. australis* group. At San Clemente it was taken at Wilson's Cove and Middle Ranch by Dr. J. T. Scott and myself. On Santa Catalina my wife and I took it at Rancho Escondido, Fisherman's Cove, the Mausoleum, and Cape Canyon. At Fisherman's Cove several males were found resting on the cup-shaped flowers of *Calochortus*.

(2). *Diadasia mimetica* (Cockerell), described in 1924, from Santa Cruz Island (Van Duzee) as *D. australis mimetica*. The area of metathorax is dull in both sexes, the females have narrow, sharply defined abdominal bands, and the males have a finger-like process at end of hind basitarsi. I found a pair at Fry's Harbor, Santa Cruz Island, August 20, at flowers of *Opuntia littoralis*. Both sexes occurred on San Nicolas Island, where no *D. opuntiæ* were found. On San Clemente several were collected by J. T. Scott and myself, and my wife and I took it on Santa Catalina at Fisherman's Cove (some on the *Calochortus*

flowers), Cape Canyon and Rancho Escondido. This species is not a race of *D. australis*, but it is very close to *D. rinconis* Cockerell, described from New Mexico. In the females of *D. rinconis* the abdominal bands are broader with the anterior (cephalad) margin strongly undulate. Specimens collected by Timberlake at Riverside at flowers of *Opuntia parryi*, May 27, are clearly *D. rinconis* and not *mimetica*. *D. australis petrinus* Cockerell, 1923, from San Pedro Martir Island, is really a form of *D. rinconis* with no strong characters. In the female of *D. australis* (Cresson) tergites II to IV have the same white apical bands and the surface before them is thinly covered with light hairs. Specimens before me are from Denver (Figgins) and Livermore (Baker) in Colorado, and Santa Fé Canyon (Cockerell) in New Mexico.

THE MALE OF BUPRESTIS CONNEXA

(Coleoptera, Buprestidae)

In dissecting genitalia of *Buprestis connexa* Horn, a male specimen taken at Camp Richardson, Lake Tahoe, California, July 16, 1938, was discovered. I am indebted to Mr. L. B. Boyer for this specimen. As no previous records of the male of this species have come to notice and as the species of *Buprestis* are placed subgenerically by the characters of the anterior tibiae of the males, this discovery is considered significant.

The male is similar to the female in general appearance but differs as follows: length, 13 mm. (15 mm. in the female); head green on occiput (cupreous in the female); pronotum with a slight depression near each anterior angle, green around lateral margins (cupreous in the female); elytra with lateral margins less cupreous than in the female; last ventral segment of abdomen subtruncate apically (distinctly emarginate apically in the female). Anterior tibiae simple, not internally emarginate, and armed with a subapical, reflexed tooth.

On the basis of the anterior tibiae *connexa* should be placed in Casey's subgenus *Cypriacis* with *aurulenta*, *adjecta*, etc., rather than following *gibbsi* in the typical subgenus *Buprestis*. *Buprestis fasciata* Fabr. and *Buprestis langi* Mann., likewise belong in *Cypriacis*.—J. R. Helfer, Caspar, California.

NEW SPECIES OF MALACHIUS FROM CALIFORNIA

(Coleoptera, Malachidæ)

BY RALPH HOPPING

Vernon, British Columbia

The writer has before him all of the known species and two new species of that *Malachius* group having the antennæ pectinate and in which the elytra are not appendiculate. Most of these species can readily be placed by means of Fall's key* published in 1901. To the species *mixtus*, however, have been relegated numerous females, many of which, upon discovery of males, have proven to be new species.

This paper was written at San Luis Obispo, California, while on my vacation in March and April, 1937.

Malachius yuccæ Hopping, n. sp.

Male. Length: 3 mm. Shining. Color blue-green except a broad band on anterior part of head, the under side of first segment of antennæ, the lateral margins of prothorax, and a central median band on each elytron, which are testaceous; a spot at apices of elytra rufous; tarsi sometimes lighter in color; pronotum with a broad testaceous band at lateral margins, the longitudinal central portion blue-green and shining; each elytron with a broad longitudinal testaceous stripe terminating at apex in a rufous spot.

Elytra not appendiculate. Antennæ pectinate, the pectinations on segments V to X longer than the segments and slender.

Female. Similar to the male but without the longitudinal stripe on each elytron although there is an indefinite indication of a stripe just above the apical rufous spot. Antennæ strongly serrate.

Pronotum wider than long in both sexes, with posterior margins broadly explanate. Elytra scabrous with indefinite longitudinal carinæ.

Holotype, male, allotype, female, and a paratype of each sex from Banning, California, collected by the author on March 6, 1933, from the flowers of *Yucca arborescens* Torr.

Superficially this species looks like the male and female of *floricola* Martin but the male antennæ in *yuccæ* are pectinate rather than serrate as in *floricola*. *Yuccæ* should be placed just

*Fall, H. C., Occ. Pap., Calif. Acad. Sci., VIII, pp. 247-248, 1901.

before *macer* Horn, a species with very much shorter pectinations of the antennæ. Three additional females were collected at Banning on March 30, 1937. Evidently a male and a female collected by Mr. F. W. Nunenmacher in Esmeralda County, Nevada, June 6, 1908, also belong to this species.

***Malachius blaisdelli* Hopping, n. sp.**

Male. Shining and densely black in color except for the usual partly testaceous areas on the front of the head and near the eyes; lateral margins of pronotum and tips of elytra reddish; elytra shining dark blue; antennæ entirely black; pronotum with a black central area reaching the anterior and posterior margins, with a small black spot subbasally on either side; elytra dark blue except for rufous tips which fade to testaceous anteriorly; apical spots rather large and extending V-shaped into the blue of the elytra; ventral surface intensely black except for pale prothorax and margins of ventral segments; legs entirely black. An ashy, sparse, erect vestiture, especially on elytral margins and toward their apices and more or less on the ventral surface and legs.

Head with longitudinal depressions just inside the antennæ, with a broad, central, raised area between them. Antennæ pectinate with the pectination of segment V broader at base than at apex and shorter than VI; pectinations on segments VIII and IX longer than those on VI and VII, slightly longer than the segments and moderately stout. Pronotum broader than long. Elytra faintly scabrous; slightly wider near their apices. Length: 3 mm.

Female. Similar to the male but with the antennæ rather strongly serrate; the ashy, erect vestiture denser, and the lateral pronotal spots nearly obsolete.

Holotype, male, (No. 4764), and allotype, female (No. 4765), Calif. Acad. Sci., Ent., in the Blaisdell collection, taken at Stockton, California, May 12, 1933, by F. E. Blaisdell. Paratypes: two males and three females, Stockton, California, April 23, 1931; and two males and one female, near Lodi, San Joaquin County, California, April 12, 1930; all collected by F. E. Blaisdell. All paratypes in the collection of F. E. Blaisdell deposited in the collection of the California Academy of Sciences except for a pair in the collection of the author.

This species is nearest *mixtus* Horn but is more slender and smaller, *mixtus* being 3.5 to 4.5 mm. in length. Occasionally a female of *blaisdelli* lacks the lateral black spot on the pronotum.

FOUR NEW CENTIPEDS OF THE GENUS *CRYPTOPS*

BY RALPH V. CHAMBERLIN

University of Utah

The types of the following new species of *Cryptops* were found among material taken at quarantine and submitted to me for identification by the United States Bureau of Entomology and Plant Quarantine.

Cryptops nautiphilus Chamberlin, n. sp.

Cephalic plate with posterior margin free and overlapping the first dorsal plate; without longitudinal sulci. First dorsal plate with a sharply impressed transverse sulcus which is angled at the middle; behind this a W-shaped impression with longitudinal sulcus proceeding caudad from each angle of the W. The succeeding tergites bisulcate except the last, which bears a large, suboval, median impression; median keel not developed. Anterior margin of prosternum nearly straight, bearing few setæ. Ventral plates smooth, most showing a distinct median longitudinal sulcus crossed by a transverse one, the parts of which are commonly oblique. Last ventral plate short and broad, subsemicircular. Stigma elliptic. Pseudopleuræ subtruncate posteriorly, pores in an anterior patch, not reaching caudal margin by a wide space. Tarsi of all but posterior legs single jointed. Prefemur and femur of anal legs flattened above, sulcate over distal portion; prefemur with numerous spines beneath and laterally, the femur similarly armed on mesal and ventral surfaces; tibia with three stout curved teeth along ventromesal edge; first tarsal article with two similar teeth of which the distal one is larger and is near middle of length of joint. Length, 19 mm.

From Mexico. One specimen taken on banana leaf at quarantine in New Orleans, August 13, 1936.

Nautiphilus suggests *detectus* Silvestri, but is a larger species differing in having only three ventral teeth on tibia of anal legs, instead of six, and in various other details.

Cryptops venezuelæ Chamberlin, n. sp.

Dorsum in general dusky with head, first tergite, and last tergite, together with all appendages, yellow. Cephalic plate without sulci. First dorsal plate without either transverse or longitudinal sulci. The following dorsal plates likewise without complete sulci; these complete only on more posterior plates. Ventral plates with sulci forming a cruciform impression. Last ventral

plate with caudal margin straight or nearly so, the posterior corners rounded. Pseudopleuræ truncate, with pores small, about a dozen on each side in a triangular patch below ventral plate and with apex caudad, not reaching posterior margin. Tarsi of all but posterior legs one-jointed. Prefemur and femur flattened above and sulcate at distal end; bearing on mesal and ventral surfaces numerous short spines and prefemur with some on outer face where femur bears finer hairs or setæ; both of these articles without teeth except a dentiform process of intermediate character at distal end of femur below. Tibia with a series of five (six on one side) teeth and the first article of tarsus with two. Length about 10 mm.

From Venezuela, taken at quarantine in Washington, D. C., July 22, 1936.

Cryptops watsingus Chamberlin, n. sp.

Color yellow throughout. Cephalic plate not sulcate. First dorsal plate with transverse sulcus angled at the middle behind which is the typical W-shaped mark followed by the usual paired sulci. The following tergites with typical paired sulci. Prosternal margin straight or but slightly bowed, with setæ sparse. Ventral plates with cruciform impression. Last ventral plate with corners widely rounded, the median portion of caudal margin straight. Tarsi of all except posterior legs uniarticulate. Pseudopleuræ apparently without pores, in their usual position an area of short spinous points. Prefemur and femur clothed with the usual spines, those on ventral surface of femur more sparse, these articles with finer, sparse hair above and ectally; no teeth; both joints sulcate at distal end above. Tibia of anal legs with four equal teeth below, the first tarsal joint with three. Length, 20 mm.

From Guatemala, taken at New Orleans in debris on bananas, July 23, 1936.

Cryptops positus Chamberlin, n. sp.

Cephalic plate free and overlapping the first dorsal plate, without sulci. First dorsal plate with sharply impressed, transverse sulcus angled at middle; paired sulci very fine, ending in a W-mark caudad of transverse sulcus. Tergites finely bisulcate except the last which has a median depression; no median keel. Prosternal margin straight. Ventral plates with the usual cruciform impression. Last ventral plate wide, sides converging caudad, the caudal corner widely rounded. Pseudopleuræ truncate; pores in a patch along ventral plate, not reaching caudal margin by a wide space. Tarsi of all but posterior legs one-jointed. Prefemur and femur of anal legs flattened above and below, dorsally sulcate from end to end, the sulcus deepest caudally; these joints bearing

numerous spines ventrally and mesally as usual but having a narrow longitudinal glabrous band along mesal face of femur; femur with a tooth on mesoventral edge about one-fourth the length from the caudal end; tibia with a series of four teeth; first tarsal joint with two ventral teeth. Length, 17.5 mm.

Holotype from Honduras; one specimen taken at New Orleans November 1, 1937. Paratype from Nicaragua; two specimens taken at quarantine at New Orleans, November 21, 1936.

Very close to *C. nautiphilus*, but a more robust species with the articles of the anal legs decidedly thicker and proportionately shorter.

NOTES ON THE MELOIDÆ

Lytta agrestis Fall (1901), described from three specimens in the American Museum of Natural History, is extremely rare and apparently unrepresented in any of the larger western collections. Recently, however, Mont Cazier called my attention to four perfect male specimens of this species taken by R. P. Allen, 20 miles east of Tuba City, (northeastern) Arizona, on June 26, 1938.

Also taken at the same locality was a unique damaged specimen which P. J. Darlington, Jr., was kind enough to compare with Leconte's type of *Lytta cribrata*. This species was taken by the Mexican Boundary Commission (1853) and is apparently known only from the type. Unfortunately the condition of the Tuba City specimen made it impossible to positively identify, although it did seem to approach the type.

Epicauta magnomaculata J. O. Martin (1932) was described from a series of nine specimens taken at Ballarat, Panamint Valley, Inyo County, California, May, 1931. I had never seen any other specimens except this series in the California Academy of Sciences until recently when looking over some material taken by Messrs. J. DuBois, B. White and V. Wooley. They took 112 specimens from two bushes of Arrow-weed, *Pluchea sericea*, at Stove Pipe Wells, Death Valley, California, on April 13, 1938. It is interesting to note the manifestation of their gregarious habit, the specimens having been taken on two bushes close together while, although a considerable area surrounding these bushes was surveyed, no additional specimens were found.—K. L. Maehler.

ON THE STANDING OF THE GENUS *LIBURNIA* STÅL

(Hemiptera, Fulgoridæ)

BY EDWARD P. VAN DUZEE

California Academy of Sciences

In zoological nomenclature it probably is impossible to formulate any rule or set of rules that will fit all cases. There always will be the element of personal judgment to interject itself into the application of such rules. One of these puzzling cases is that of *Liburnia* Stål. No student of nomenclature questions for a moment the rule that the type of a genus must be found among the species included in the genus at the time it was founded. However, the name *Liburnia* was first given by Stål, not as a new genus, but as a name for what was at that time an old and well known generic concept. Therefore to find its type, one must first locate the type of the genus that had been masquerading under that name. The whole trouble comes from the fact that Stål, in 1866, called that genus *Delphax* Auct. instead of *Delphax* Latreille. Stål's meaning will become perfectly plain to anyone who will look up the history of the generic name *Delphax*. To ignore these facts and misinterpret Stål's use of *Delphax* Auct. is a mere quibble.

Here are a few pertinent facts: Latreille, in 1796, described a genus *Cercopis* in his "Precis" (p. 91) for which he substituted *Asiraca* at page 202 but without the mention, in either place, of a species. This genus *Asiraca*, he validated in 1802 by including the species *longicornis* Latr., *clavicornis* Fabr. and *crassicornis* Fabr. In the meantime (1798), however, Fabricius had established his genus *Delphax* with *crassicornis* and *clavicornis* as species, and in 1803 he added eight other species. In 1804 Latreille reaffirms his genus *Asiraca*, complains that Fabricius had redescribed it as *Delphax*, and lists nine species, among them *clavicornis*, *crassicornis* and *pellucida*, thus making his *Asiraca* equivalent to *Delphax* of Fabricius. But in 1807 he recognizes *Asiraca* with *clavicornis* and four other species, and *Delphax* Fabr. with "*pellucida* Fabr. "*ejusd.* *Delphacies flavesceus, striata, marginata, minuta.*" This statement by Latreille distinctly designates *pellucida* as the type of his genus *Delphax* and it is this generic concept that was used by practically all hemipterists until Stål corrected the liberties Latreille

had taken with Fabricius' genus, by renaming *Delphax* of Latreille as *Liburnia*. This genus *Liburnia*, as named by Stål in 1866, was so used by Scott in his revision of the family in 1870-1871, by Sahlberg in 1871, by Fieber in his Katalog of 1872 and in his monograph of 1875, by Melichar in 1896 and by me in 1897. Until the time of Muir, the only work of a monographic character in which the name *Delphax* was used in place of *Liburnia* was that by Kirschbaum, and it is probable that this work (1868) was written before Kirschbaum had seen Stål's Hemiptera Africana.

The validity of the name *Delphax* Fabricius does not affect the standing of genus *Liburnia* Stål and need not be considered here.

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1802. Walckenaer, *Faune Parisienne, Insectes*, vol. 2, p. 329, *Delphax* (*crassicornis* & *clavicornis*).
1802. Latreille, *Histoire Naturelle des Crustaces et des Insectes*, vol. 3, p. 259. *Asiraca* (*longicornis*, *clavicornis* and *crassicornis*).
1803. Fabricius, *Systema Rhyngotorum*, p. 83. (Equals *Delphax* Auct.).
1804. Latreille, *Histoire Naturelle des Crustaces et Insectes*, vol. 12, p. 316. (*Asiraca*, equals *Delphax* Auct.)
1807. Latreille, *Genera Crustacearum et Insectorum*. Vol. 3, p. 167 (*Asiraca*), p. 168 *Delphax* (*pellucida* "ejusd. *flavescens*) and three more.
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1818. Germar, *Mag. Ent.*, vol. 3, p. 205; continued in vol. 4, p. 105, 1821. (*Asiraca* for *clavicornis* and *Delphax* for other species.)
1826. Fallen, *Hemipt. Sueciæ, Cicadariæ*, p. 73. (*Delphax*, includes *crassicornis*, *pellucida* and allies.)
1828. Zetterstedt, *Fauna Insectorum Lapponica*, p. 547. (*Delphax pellucida* and three others.)
1829. Germar, *Thon's Entomologische Archiv*, vol. 2, p. 57. (*Asiraca* with eight species, *Delphax* with *pellucida* and nine other species.)

1835. Burmeister, Handbuch der Entomologie, vol. 2, p. 150. (*Delphax*, three species, *Asiraca*, two species.)
1837. Curtis, British Entomology, vol. 7, plate 657 (for *longipennis*, names *minuta* pseudotype. Plate 445 *Asiraca pulchella*.)
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GENUS LIBURNIA Stål

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- 1870-1871. Scott, Revision of the Family Delphacidae with descriptions of several new species of the Genus *Delphax* of authors. (Ent. Monthly Mag., vol. 7, pp. 22, 67, 193, monographic.)
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A NEW SPECIES OF ACMÆODERA (COLEOPTERA- BUP-
RESTIDÆ) WITH BIOLOGICAL NOTES ON OTHERS
FROM SANTA BARBARA COUNTY, CALIFORNIA

By BURDETTE E. WHITE

University of California, Berkeley

Sunset Valley, which is near Figueroa Mountain in the Santa Barbara County portion of the Coast Range, has, through the results of three collecting trips, been proved to be an unusual region for the genus *Acmæodera*. A total of 18 species and 2 subspecies was found to inhabit this area. Two of these were new species with the probability of a third being new. One of these has since been described while another is described below.

Two of the three trips were made exactly one year apart—July 4, 1937 and 1938. The third trip followed two weeks after the second. The members of the first trip were Mr. George Holsten and the author; the second included Mr. V. L. Woolley, Mr. Robert Zaph, and the members of the first trip; the third trip was a hasty but successful one made by Mr. Mont Cazier and the author.

The 1937 seasonal development of the flora was apparently about two weeks earlier than that of 1938, probably due to the abundance of precipitation in the intervening winter. This may or may not have been responsible for the fact that a slightly different group of species was taken on each of the trips. The majority of the specimens and representatives of all the species were collected along a three mile stretch of road that was cut through the "chamise belt" at about 2000 feet elevation. The fact that 19 members of a single genus were collected in such a restricted area seems in itself worthy of mention; however, along with the list of these species will be included the preferred plant of each as was shown by the persistence of the adults in flying to, or by the fact that they were consistently beaten from, the same species of plant.

The main plants with which the *Acmæodera* were associated were scrub oak, *Quercus dumosa*; hard tack, *Cercocarpus betuloides*; chamise, *Adenostoma fasciculatum*; *Eriodictyon crassifolium* variety *traskiæ*; Christmas berry, *Photinia arbutifolia*;

manzanita, *Arctostaphylos* sp.; and an unidentified, small, yellow-flowered composite. These, with a few other species of plants, formed a rather dense association on the shale slopes.

Although host preferences are of very little significance for adult *Acmæodera* according to the general consensus of opinion, the author is convinced that they have some biological significance, at least locally. On the three trips which were taken at relatively wide intervals, careful observations were made of the host preferences of each species. Each particular species, with the exception of those visiting flowers, was consistently taken on a single species of plant. This, together with the fact that numerous specimens were collected, that the plants were not at all isolated but growing in close association, and finally that similar results were obtained on each of the three trips, surely suggests at least a strong degree of local host selectivity. However, most of the species from the Santa Barbara region have been reported from different plants in other localities, which would indicate that the host specificity is local or that there has been some error in the citing of the plant species.

ACMÆODERA FENYESI Fall

Over sixty individuals of this well-known species were taken as they flew to *Eriodictyon crassifolium* var. *traskiæ*. Not a single specimen was observed flying to any other plant and none was beaten from any other plant. These specimens of *fenyessi* differ from the typical form by being entirely immaculate and in being more shining bronze.

ACMÆODERA PLAGIATICAUDA Horn

Seven specimens of this rare species were collected after hours of beating manzanita shrubs (*Arctostaphylos*). These specimens present a considerable degree of variation from *plagiaticauda* of other regions. The median lateral spot of the elytra is straw-yellow in place of the usual red of more northern specimens.

ACMÆODERA JOCOSA Fall

Some 200 specimens of this beautiful species were taken. All were swept out of the air as they hovered over *Adenostoma fasciculatum*, or were collected from the tips of the branches of

that plant. Not a single specimen was observed to light on any other plant but this, although other species of plants often grew so close as to have their branches mixed with those of the *Adenostoma*.

ACMÆODERA ADENOSTOMÆ Cazier

The author collected 30 specimens of this species and approximately 30 more were taken by the other members. The preferred plant, as the name implies, is the chamise, *Adenostoma fasciculatum*. This species greatly resembles *jocosa* in markings and was taken with that species on the same plant.

ACMÆODERA COQUILLETTI Fall

Over 50 specimens of this pretty species were collected from *Quercus dumosa*. They were not observed on any other plant.

Acmæodera holsteni White, new species

Moderate sized; dark chocolate bronze; broad and somewhat depressed, the sides of body parallel to apical third of elytra; elytra with a series of three transverse lateral spots, the anterior spot largest and yellow, located medianly and internally curved forward, the mid-spot smaller and red externally, the posterior spot subapical, small and reddish marginally. The dorsum moderately covered with rather long, erect, light gray and fuscous hairs, somewhat recumbent over apices of elytra.

Head densely covered with medium sized punctures; upper portion densely covered with erect dark hairs, the lower portion immediately above clypeus more sparsely covered with shorter whitish hair. Antennæ finely pubescent, the last seven segments broadly serrate, extending back as far as basal third of pronotum. Pronotum as wide as base of elytra and a little less than twice as wide as long, 7:4; evenly, moderately punctured on the disk, the punctures increasing in size laterally; lateral margin gradually, evenly rounded to apical angle; a median, shallow carina extending from base to apical third; a conspicuous shallow fovea near basal angles; surface relatively densely clothed with long, erect, dark and light hairs which are much shortened at apical angles; basal margin reflexed ventrally so as to be visible only from a lateral view. Elytra each with a median lateral kidney-shaped spot yellow, extending from margin two-thirds of the distance to suture; another spot at apical fourth narrower, externally red, extending from margin three-fourths of the way to suture; a third subapical spot more red than yellow; elytral intervals smooth on the disk, laterally rugose, first three

striae consisting of well defined circular punctures basally but becoming elongate posteriorly, finally coalescing into a narrow groove at the middle and extending thus to apex, the intervals with a row of fine punctures with a single hair arising from each; umbone conspicuous. Body beneath bronze; evenly punctured except at base of first ventral segment which is more coarsely punctured; latero-ventral area between second and third pairs of legs and especially near elytral margin covered with long white hair; prosternum trisinate with strong cusps. Length, 9mm.; breadth, 3:25 mm.

Holotype, female, and allotype, male, collected at Sunset Valley, Santa Barbara County, California, July 4, 1938. Four hundred paratypes, mostly collected by Mr. George H. Holsten and the author on *Adenostoma fasciculatum* at the same locality and on the following dates: July 4, 1937, July 4, 1938, and July 16, 1938. A few specimens were also collected by Mr. M. A. Cazier, Mr. V. L. Woolley, and Mr. Robert Zaph, all from the above locality. A single specimen was collected by Mr. C. D. Michener at the Frances Simes Hastings Natural History Reservation at Jamesburg, Monterey County, California, June 13, 1938, elevation 1900-2700 feet (Santa Lucia Mts.). A specimen labeled, "San Gabriel Mts. Cal., VI-1920" and one labeled, "Pasadena, Cal., VI-10-1916" are in the Cazier collection. Paratypes are deposited in the collections of the following men: Mr. Frank Parker, Mr. C. A. Frost, Mr. J. J. du Bois, Dr. H. C. Fall, Mr. Mont Cazier, Mr. H. B. Leech, Mr. Robert Zaph, Mr. V. L. Woolley, Mr. M. Embury, and in the California Academy of Sciences.

It is with great pleasure that this species is named after Mr. Holsten, who so kindly aided the author in collecting most of the above-mentioned specimens.

Acmaeodera holsteni has been confused with several other species, particularly *coquilletti* and *angelica*. *Holsteni* differs from *coquilletti* by being darker (chocolate bronze), while the latter has a highly shining, brassy dorsal surface. *Holsteni* is also broader, more depressed, and more blunt apically. There are also good differences in the structure of the subgenital plates in the females of the three species (see figures). From *angelica*, *holsteni* differs by having the dorsal surface smooth. *Angelica* typically has the dorsal surface shining black, has a

different structure and placement of the spots, is less depressed, and has the apices of the elytra more pointed, and the margins of the pronotum less evenly rounded apically than in *holsteni*.

Holsteni is constant in all characters but the spots. Occasional specimens have an additional sub-basal yellow spot on each elytron. Other specimens have been observed with a considerable reduction in the size of the spots. The sexes can be distinguished only by dissection.

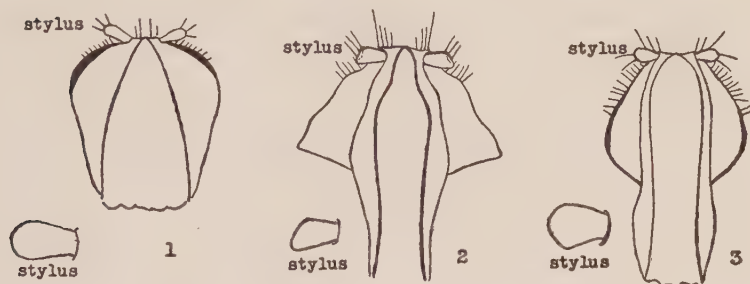


Fig. 1, *Acmaeodera coquilletti* Fall, subgenital plate of female; 2, *A. holsteni* White, n. sp., same; and 3, *A. angelica* Fall, same.

ACMÆODERA ANGELICA Fall

Several specimens of this variable species were taken from *Cercocarpus betuloides*.

ACMÆODERA ANGELICA NEXA Fall

Over one hundred specimens of this form were collected along with *angelica* on *Cercocarpus betuloides*.

ACMÆODERA HEPBURNI LeConte

This species occurred abundantly on the flowers of *Eriodictyon crassifolium* var. *traskiae* as well as on various other flowers, particularly a small yellow-flowered composite.

ACMÆODERA QUADRISERIATA Fall

This species, though not common, was taken on a variety of flowers. It was found most abundantly on the above-mentioned yellow composite.

ACMÆODERA ACUTA LeConte

Numerous specimens were swept from the yellow-flowered composite along with *hepburni*, *quadriseriata*, and *gemina*. These specimens differ considerably from the usual *acuta* in their smaller average size, the reduction of the markings of the elytra, and by their stronger brassy lustre.

ACMÆODERA CONNEXA LeConte

Only a few of this otherwise common and well-known species were collected. They were found on various flowers, including milkweed (*Asclepias*).

ACMÆODERA PRORSA Fall

More than fifty examples of this beautiful species were collected from *Eriodictyon crassifolium* var. *traskiæ*. On the last trip when the blossoms of the *Eriodictyon* were found to be dried up, eight specimens of *prorsa* were caught flying about the blossoms of *Photinia*.

ACMÆODERA SINUATA Van Dyke

This strikingly distinctive species was apparently rare. However fifteen specimens were taken, and all were from *Cercocarpus betuloides*.

ACMÆODERA DOHRNI Horn

These specimens are here called *dohrni* only tentatively. They differ from the description of that species in several features and a definite decision cannot be made before they are compared with the type. Fourteen examples were collected from the *Cercocarpus betuloides*.

ACMÆODERA MARIPOSA BERNARDINO Van Dyke

A dozen specimens were taken from *Cercocarpus betuloides*. A few of the specimens are more brassy and are lighter colored than the specimens described by Van Dyke, but they are similar in markings and other characteristics.

ACMÆODERA DOLOROSA Fall

Two specimens of this species were taken in flight.

ACMÆODERA POSTICA Fall

Twenty specimens of this rather uncommon species were beaten from *Cercocarpus betuloides*.

ACMÆODERA GUTTIFERA LeConte

Ten examples were caught flying about and resting on the small dead twigs of *Cercocarpus betuloides*.

ACMÆODERA GEMINA Horn

Several specimens of both the vittate and the mottled form (*nebulosa* Horn) were collected in flight, on dry grass, and on the small yellow-flowered composite.

BIOLOGY OF VESPINE WASPS

A Contribution to the Biology of North American Vespine Wasps. C. D. Duncan, Stanford Univ. Publ. Biol. Sci., Vol. VIII, No. 1, 272 pages, LIV plates, 1939. Price, paper, \$2.50; cloth, \$3.25.

The accumulated observations, dissections, and experiments of twenty years have been brought together in excellent style in this combined morphological, systematic, and biological account of the vespine wasps. Sixty-eight pages and thirty-two plates are devoted exclusively to a detailed account and portrayal of the skeletal and muscular morphology of the Western yellow-jacket, *Vespula pensylvanica* (Sauss.). A high standard of perfection has been attained in delineation of morphological details and in the labeling and reproduction of plates.

Systematically, three genera are recognized and defined on the basis of structural and biological characteristics, namely *Vespa* Linnaeus, *Vespula* Thom., and *Dolichovespula* Rohwer.

The biological section deals with "habits, behavior, nest building, and life history" of various species of Vespinae including descriptions of the immature stages of *Vespula pensylvanica*. This section is profusely illustrated with fifty-eight separate photographs of nests and nesting sites, excellently reproduced by the collotype process.

Dr. Duncan has shown, in this work, what can be accomplished by intensive and enlightened research, even on the commonest of insects.—R. L. Usinger.

TAXONOMY OF THE TYPICAL SUBGENUS ODYNERUS
IN NORTH AMERICA

(Hymenoptera, Vesidæ)

BY RICHARD M. BOHART

University of California, Los Angeles

Since the publications by S. A. Rohwer on *Odynerus*, this large and systematically complex genus has been relatively neglected in America. The excellent work of J. Bequaert constitutes an outstanding exception to this statement, but his papers lay emphasis more on the eastern than on the western species.

The author recently had the opportunity of studying the more important collections of *Odynerus* in this country, and this paper is the first of a series to be published on the genus.

Acknowledgment is gratefully made to the U. S. National Museum, California Academy of Sciences, Washington State College, and Joseph Bequaert for the loan of material used in this study.

ODYNERUS Latreille, sensu stricto

Odynerus Latreille, 1802. Hist. Nat. Crust. Ins., 3:362.

Epipone Kirby and Spence, 1818. Intr. Ent., 1:34.

Oplopus Wesmael, 1836. Bull. Acad. Sci. Belg., 3:45.

Oplomerus Westwood, 1840. Intro. Mod. Class Ins., Synopsis, 2:84.

Hoplomerus C. G. Thomson, 1874. Skandinaviens Hymenoptera 3(1):35, 41.

Type: *Vespa spinipes* Linneus, 1758.

The typical subgenus *Odynerus* is abundant in the Palearctic realm but is represented in North America by only a few rare species found in Canada and western United States. Some of these, however, are among the most bizarrely colored members of the genus. *Odynerus sensu stricto* is not easily separable from the subgenus *Rygchium*, as many intermediate forms exist. Two North American species which fall in this category are *aldrichi* Fox and *morelius* Sauss. (= *nigrohirsutus* Cameron and *canamexicus* Rohwer). On the basis of the character of the front face of the pronotum, however, *aldrichi* can be retained in *Odynerus sensu stricto* while *morelius* falls in *Rygchium*. To the author's knowledge, the characters of the front face of the pronotum in eumenids have not heretofore been

recognized as of systematic value. As this area is usually obscured by the head, the latter should be pulled slightly forward and downward in the process of mounting.

The following sum of characters will distinguish the North American species of the typical subgenus as defined in this paper: Vertical front of the pronotum with faint, widely separated pits or depressions (compare figs. 13 and 14); male antennæ usually rolled apically rather than hooked; first abdominal tergite without a transverse carina at its summit; second tergite with relatively uniform puncturation and little or no subapical depression.

On the basis of the absence of a carina on the first tergite *Odynerus sensu stricto* readily can be separated from *Ancistrocerus*, *Symmorphus*, and *Alastoroides*. Furthermore, it can easily be distinguished from *Stenodynerus* (including *Parancistrocerus*) by the presence in the latter of large, deep, approximate pits on the vertical front of the pronotum (fig. 14).

KEY TO THE SUBGENUS ODYNERUS OF NORTH AMERICA

1. Mesonotum without evident notaulices; predominantly black and yellow or black and white species.....2
- Mesonotum with sharply impressed notaulices usually running the entire length of the scutum; predominantly black and bright orange-red species.....3
2. With a sharp, complete carina on the anterior margin of the dorsal surface of the pronotum; with a complete whitish band across the scutellum and postscutellum; erect hair on the horizontal surface of the first tergite less than the length of an ocellus; male antennæ hooked, hardly rolled; male mandible and clypeus as in figure 5.....*aldrichi*
- Without a complete carina on the anterior margin of the dorsal surface of the pronotum; usually male only with whitish bands across the scutellum and postscutellum; erect hair on the horizontal surface of the first tergite longer than the length of an ocellus; male antennæ greatly flattened and rolled apically; male mandible and clypeus as in figure 6; male middle femur strongly serrate.....*dilectus*
3. Pronotum with a fairly sharply rounded front margin, lateral angles bluntly pointed; red coloration on first five abdominal segments; wings in female dark brown violaceous; female vertex with two distinct postocellar pits; male middle femur with a sharp sub-basal carina bordering a shallow concavity; terminal segments of male antennæ large and well coiled; male clypeus and mandible as in figure 8.....*erythrogaster*

- Pronotum without a sharp front margin, smoothly rounded off; lateral angles of pronotum rounded off, not projecting; wings in female lightly stained with brown; depressions on female vertex almost or quite obsolete; terminal segments of male antennæ small; male middle femur without a basal cavity or ridge.....4
- 4. Dorsum of thorax completely black; first two abdominal segments (at most) with red coloration; hair on second tergite about as long basally as apically; female clypeus black; male clypeus whitish-silvered; male antennæ rolled apically.....*margaretellus*
- Pronotal angles and tegulæ red-spotted; first four abdominal segments (at least) with red coloration; hair on apex of second tergite much shorter than at base; female clypeus orange-red; male antennæ not rolled apically.....*cinnabarinus*

ODYNERUS ALDRICHI Fox

(Figs. 1, 5, 9, 13)

Odynerus aldrichi Fox, 1892. Ent. News, 3:197 (type, U. S. N. M.).

Male. Black; mandible, clypeus, a line from the clypeus to emargination of eye, frontal spot, first antennal segment partly, a post-ocular spot, front margin of pronotum, tegula except a central spot, small spot on mesopleuron, complete stripe across both scutellum and postscutellum, legs for the most part, apical margins of abdominal tergites one to six, the first with a squarish attached lateral spot, and apical margin of sternites two to six, whitish; antennæ beneath and last two segments entirely, stains on femora and tarsi, anterior margins of wings, and stains on first abdominal segment, ferruginous. Body clothed with very short pubescence, clypeus not silky but almost glabrous, erect hair on horizontal portion of first tergite less than the length of an ocellus. Head and thorax coarsely, closely punctured; propodeum coarsely punctured except in the weakly striate enclosure which has definite inferior and weak exterior carinate margins; abdominal tergites with large, well separated punctures; mesoscutum without notaulices. Antennæ as in figure nine, clypeus and mandible as in figure five, genitalia as in figure one. Length to apex of second tergite, 7-9 mm.

Female. Markings as in male with following exceptions: Antennæ black, clypeus black except for two pale basal spots, mandible black except at base, first five abdominal tergites and second sternite with apical whitish bands, legs black basally, femora, tibiæ, and tarsi mostly ferruginous. Clypeus about as long as broad, weakly incised apically, latero-apical edges convex; vertex with a median semi-circular depression. Length to apex of second tergite, 9 mm.

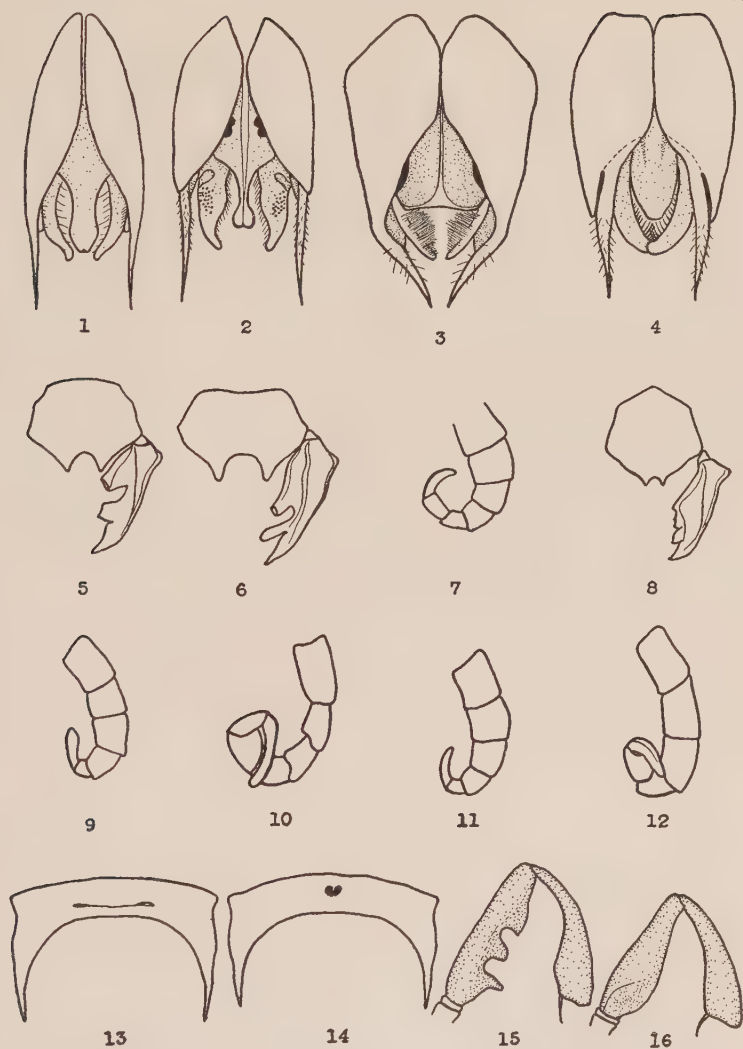


Fig. 1, *aldrichi*, male genitalia, dorsal; fig. 2, *dilectus*, male genitalia dorsal; fig. 3, *margaretellus*, male genitalia, dorsal; fig. 4, *erythrogaster*, male genitalia, dorsal; fig. 5, *aldrichi*, male clypeus and mandible; fig. 6, *dilectus*, male clypeus and mandible; fig. 7, *margaretellus*, apex of male antenna; fig. 8, *erythrogaster*, male clypeus and mandible; fig. 9, *aldrichi*, apex of male antenna; fig. 10, *dilectus*, apex of male antenna; fig. 11, *cinnabarinus*, apex of male antenna; fig. 12, *erythrogaster*, apex of male antenna; fig. 13, *aldrichi*, front face of pronotum; fig. 14, *Stenodynerus* sp., front face of pronotum; fig. 15, *dilectus*, male middle femur and tibia, lateral; fig. 16, *erythrogaster*, male middle femur and tibia, lateral.

Paratypes of this species are in the Academy of Natural Sciences at Philadelphia and at the U. S. National Museum. The data on the entire type series is Brookings, South Dakota, May and June, 1891. Additional records are as follows: One male, near Denver Glacier, Skagway, Alaska, July 1, 1923 (J. A. Kusche); three females, Grand Coulee, Washington, June, 1902; one female, Silver Bow County, Montana, August, 1937; males, Grand Teton National Park, Wyoming, July, 1937 (J. McSwain); one male, Estes Park, Colorado, July 12, 1923 (R. A. Leussler); two females, Colorado (Snow collection, University of Kansas).

O. aldrichi is readily recognized by the whitish banded scutellum and postscutellum in combination with the short pubescence on the first abdominal tergite. Specimens of a Chinese *Odynerus* in the collection of the U. S. National Museum appear to be identical with *aldrichi*. If this should prove to be the case, an earlier name may have to be used. In any event, the origin of this species in Asia and its distribution along the Rocky Mountains by way of Alaska is indicated.

ODYNERUS DILECTUS Saussure

(Figs. 2, 6, 10)

Odynerus dilectus Sauss., 1870. Rev. Mag. Zool., (2) 22:141.

Odynerus (Epiponus) dilectus Sauss., 1875. Sm. Misc. Coll., Vol. 14, 254:363.

Male. Black; mandible, clypeus, underside of antennal segments one and two, frontal spot, inner orbit below emargination of eye, postocular spot, front margin of pronotum, complete bands across scutellum and postscutellum, femora partly, tibiae mostly, tarsi at base, apical margins of first six abdominal tergites and second and third sternites, pale yellow; third to seventh segments of antenna beneath, wing veins and tarsi apically, ferruginous. Pubescence of head and thorax long, sparse, and black; upper half of clypeus sparsely pubescent; erect hairs on horizontal portion of first tergite three times as long as an ocellus; abdomen clothed with minute, appressed pubescence in addition to the erect hair on the first tergite. Head and thorax closely, moderately punctured, tending to become longitudinally striate on head below ocelli; propodeum obscurely and finely striate; abdomen minutely punctured throughout, antenna tightly coiled apically, the last segment about three times as long as wide at base; mandible three-toothed, basal tooth molar-like and followed by a deep incision (fig. 6); clypeus deeply and widely incised at apex; pronotal angles small but distinct; mesonotum without notaulices;

inferior edge of middle femur three-toothed; basal half of middle tibia strongly constricted (fig. 15); propodeum without carinae; genitalia as in figure two. Length to apex of second tergite, 7-8 mm.

Female. Markings as in male with following exceptions: Pale coloration whitish, only first four abdominal tergites banded, fourth interrupted at middle; clypeus, mandible, antenna, scutellum except for a small lateral spot, postcutellum, legs for the most part, black. Clypeus not closely but coarsely punctured, apex slightly and broadly emarginate; vertex with a well defined oblique pit behind each posterior ocellus. Length to apex of second tergite, 8 mm.

This species can be recognized at once by the extraordinary serrate middle femora of the male. The only species with which it might be confused is the European *spinipes* (Linn.). In the latter, however, the last antennal segment in the male is less than twice as long as broad at the base. Also, the basal tooth of the middle femur is more slender in the latter. Otherwise the two species are extremely similar. Specimens of *dilectus* are in the U. S. National Museum collection from New Mexico, Colorado, and Edmonton and Banff, Canada. Additional records are: Two females, Coupeville, Washington, April 30, 1898; one male, Eagle Ridge, Klamath Lake, Oregon, May 23, 1924 (C. L. Fox).

Odynerus erythrogaster Bohart, new name

(Figs. 4, 8, 12, 16)

Monobia bicolor Provancher, 1888. Add. Faune Hymen, Canada, Suppl. p. 429 (nec *Odynerus bicolor* Saussure, 1856).

Male. Black; clypeus except marginally, a post-ocular spot, and usually apical margins of first to fifth tergites, whitish yellow; lateral spot on pronotum (not always present), femora apically, tibiae and tarsi entirely, abdominal tergites one to five except the apical margins and median basal black spots on tergites one to three, sternite one partly, sternite two entirely, and sternites three and four mostly, bright orange-red; wing heavily brown-stained especially around the margins. Head, thorax, first and second abdominal sternites, first tergite and base of second, covered with erect, long, black hair; clypeus also with appressed, silvery pubescence; abdominal sternites three to six with dense, fulvous pubescence especially toward the center. Head and thorax coarsely punctured, more sparsely on thorax, becoming obsolete on posterior face of propodeum; abdomen minutely punctured. Antenna coiled

at apex, last segment less than twice as long as broad at base and strongly flattened and curved; clypeus and mandible as in figure eight. Thorax as viewed from above about one-third longer than broad; pronotum with a fairly sharply rounded front margin, lateral angles bluntly pointed; thorax flattened dorsally beginning at middle of mesoscutum; mesoscutum with well defined notaulices; middle femur with a flattened area at base (fig. 16); first abdominal sternite with a faint median basal suture; genitalia as in figure four. Length to apex of second tergite, 9-11 mm.

Female. Markings as in male with following exceptions: Clypeus entirely black, no yellowish bands margining abdominal tergites, only the first five tergites with red coloration, wings more darkly brown-stained and distinctly violaceous. Pubescence as in male except on clypeus which is without appressed pubescence. Clypeus with a sharp, straight apical truncation of moderate breadth; with an oblique foveate depression behind each posterior ocellus. Length to apex of second tergite, 9-10 mm.

This species had gone unrecognized until the type, acquired by the U. S. National Museum with the Coquillet collection, was identified by J. Bequaert as an *Odynerus*. Together with *margaretellus* and *cinnabarinus*, it forms a peculiar group of hairy, black and orange-red *Odynerus*. The red coloration is not dissimilar to that caused by overexposure to cyanide fumes but is brighter and more intense. In addition to their pubescence and coloration these three species are unique in having deeply impressed notaulices. At present *erythrogaster* is known only from southern California where it frequents the sides of dry canyons. The following records are available: One male, Coalinga, May 14, 1938 (M. Cazier); one female and two males, Los Angeles County; one female, Los Angeles County (D. W. Coquillet, holotype); one female, Soboba Springs, Riverside County, June 3, 1917 (E. P. Van Duzee); five females, Riverside, May (P. H. Timberlake); one female, Edom, Riverside County, March 14, 1937 (E. G. Linsley).

ODYNERUS MARGARETELLUS Rohwer

(Figs. 3, 7)

Odynerus margaretellus Rohwer, 1916. Proc. U. S. Nat. Mus., 49:242 (holotype, U. S. N. M.).

Male. Black; clypeus whitish yellow; femora partly, tibia and tarsi entirely, first two abdominal tergites except at base, first four sternites mostly, bright orange-red; wings moderately brown-stained around the margins. Head, thorax, and abdomen except third and following sternites clothed with long, black, erect hairs;

clypeus also silvery pubescent; third and following sternites with thick fulvous pubescence toward the center and black hair toward the sides. Head and thorax coarsely punctured, posterior face of propodeum finely punctured, hardly striate; abdomen minutely punctured. Antenna loosely coiled at apex, last segment strongly flattened and about twice as long as wide at the base; mandible obscurely five-toothed, about as in figure eight; clypeus angularly emarginate at apex, about as in figure eight. Thorax, as viewed from above, about as long as broad at the tegulæ; pronotum smoothly rounded off, lateral angles rounded off, not projecting; mesoscutum with well defined notaulices; scutellum not flattened on top, convex. Median basal suture of second abdominal sternite obsolete or absent; genitalia as in figure three, the ædeagus greatly expanded and truncate apically. Length to apex of second tergite, 8 mm.

Female. Markings as in male with the following exceptions: Clypeus black, third and following abdominal sternites black. Clypeus coarsely and sparsely punctured, clothed only with long black hairs, angularly emarginate at apex. Vertex with a tiny, almost indistinguishable, pubescent pit behind each posterior ocellus. Length to apex of second tergite, 9 mm.

The characteristic which makes this species outstanding is that at most the first two abdominal tergites are marked with red. It is easily separated from *erythrogaster* by the much darker wings and more pointed prothoracic angles of the latter. The male genitalia are also very different. Records of the species are: One female, Asotin, Washington, April 15, 1923 (V. Argo); one female, North Yakima, Washington, May 27, 1903 (Eldred Jenne); one male and one female, Klamath Falls, Oregon, May 10, 1924 (C. L. Fox); one female, Blitzen Valley, Harney County, Oregon, April 19, 1936 (S. G. Jewett); type series, one female and two males, Troublesome, Colorado, altitude 7,345 feet, June 8, 1908 (S. A. Rohwer).

Odynerus cinnabarinus Bohart, new species

(Fig. 11)

Male. Black; clypeus yellowish; a small postocular spot, a large spot laterally at the pronotal angle, tegula, femora mostly, tibiæ and tarsi entirely, and first five abdominal segments except for basal black spots at the middle of tergites one to three, bright orange-red. Wings slightly stained with brown especially around the margins. Head, thorax, and first abdominal segment sparsely covered with long black hair; black hair on second and following tergites averaging only about two and one-half ocellus lengths, that on second sternite longer; third and following sternites very

sparsely covered with black hair but with thick golden pile toward the middle; clypeus, in addition to black hair, with thick yellowish-silver appressed pubescence; abdomen and legs with minute golden pubescence. Head and thorax strongly punctured, becoming less dense on thorax, almost obsolete on propodeum; abdomen minutely punctured. Antenna intermediate between rolled and hooked types (fig. 11), last segment about twice as long as broad at base; mandibles five-toothed, the two basal teeth almost indistinguishable; clypeus about as long as broad, with two sharp teeth on either side of angular apical emargination (mandible and clypeus about as in fig. 8). Thorax, as viewed from above, about as long as broad at tegulae, front margin of pronotum and pronotal angles completely rounded off; mesonotum with notaulices deeply impressed; scutellum convex; propodeum without carinae setting off enclosure. Second sternite with a faint, almost obsolete, basal median suture; genitalia stout, tips of squamæ bent inward and crossing each other, volsella slender as viewed dorsally but triangular, plate-like, as viewed laterally, ædeagus truncate apically and inflated, with sharp median dorsal ridge and depressed sides (proportions from dorsal view about as in fig. 3). Length to apex of second tergite, 10 mm.

Female. Coloration, pubescence and puncturation as in male with the following exceptions: Clypeus bright orange-red, glabrous except for erect, long, black hair; golden pubescence on abdomen less prominent; third and following sternites without unusually long fulvous pile. Length to apex of second tergite, 11 mm.

Although very close to *margaretellus*, *cinnabarinus* can be separated by its more extensive red coloration, the shorter pubescence, and the less strongly rolled antennæ of the male. It resembles *erythrogaster* in abdominal coloration but the more prominent pronotal angles of the latter are an easy means of differentiation. At present the species is known from Utah, California, Arizona, and Texas.

Holotype, male, allotype, female, and twelve male and four female paratypes, Beaver Creek Hills, Beaver County, Utah, June; one male paratype, Death Valley, California; one female paratype, Santa Catalina Mountains, Arizona (C. D. Duncan); one male paratype, Belton, Texas, April (holotype and allotype donated by J. Bequaert, paratypes from collection of U. S. National Museum and collection of author). Holotype and allotype to be deposited in the California Academy of Sciences, paratypes in the U. S. National Museum, Academy of Natural Sciences at Philadelphia, University of Kansas, collection of J. Bequaert, and collection of the author.

NOTES ON THE GENUS SCHIZOPUS WITH A KEY
TO THE SPECIES

(Coleoptera, Buprestidæ)

BY MONT A. CAZIER

University of California, Berkeley

During the past two years, specimens of this rare and phylogenetically important genus have been taken in considerable numbers and various new and interesting facts have been observed. There are only two described species in the genus, one of which, *Schizopus sallei* Horn, has been known only from the unique female type and the other, *Schizopus laetus* Lec., from an occasional but rare specimen.

It was early observed that in *laetus* there was a good deal of sexual dimorphism, the male having the elytra brownish-testaceous, the female brilliant blue or green. Most taxonomists interested in this genus have been looking for the male of *sallei* in order to see what the sexual dimorphism would be, in as much as the female was known to have the elytra brownish-testaceous similar to the male of *laetus*. It was the good fortune of Mr. I. M. Ferguson and J. R. Warren, collecting at Mariposa, Mariposa County, California, on the summer 49 course of the University of California to obtain two specimens each of this rare species. One specimen collected was a male and has disclosed the astonishing fact that there is very little sexual dimorphism in this species. The differences between male and female will be pointed out in a brief description of the male which, to the author's knowledge, has never before been described.

SCHIZOPUS SALLEI Horn

Male similar to the female except for the venter of the abdomen which has the lateral margins not withdrawn from edge of elytra, the apical sternite shallowly emarginate at tip and the color dark cupreous-green with faint brownish tinges. In the female, the lateral margins of the abdomen are withdrawn from the edge of the elytra, the apical sternite is evenly rounded at tip and the under-surface is mottled brownish-testaceous. In the male, the dark brown vittæ extending from the humeral umbones do not reach the tip of the elytra, while in the female at hand they reach the tip but are narrowed in front. These markings are probably as variable as in the males of *laetus* which may have the green or blue sutural vittæ lacking or very broad. There are, however, no indications of humeral vittæ in *laetus* although in a

female specimen of *sallei* there are pronounced brown sutural vittæ as well as humeral vittæ.

Type locality, "Mariposa, Cala." (Horn, 1885). The male described above taken three miles south of Mariposa, about one mile south of Mormon Bar, June 13, 1938. It was collected within 25 yards of a small stream, on flowers of a species of Compositæ and on grass.

In the early spring (April 30) of 1937 Mr. Hugh B. Leech, P. C. Ting and the author made a collecting trip to the Mojave Desert and obtained a good series of both males and females of *laetus* at Cronise Lake and Ludlow, San Bernardino County, California. These specimens were taken on the flowers of *Geraea canescens*, were very sluggish and were not observed in flight. During the same season it was understood that several other collectors took good series of this species in the same region. Collecting trips to this region at about the same season in previous years have failed to yield specimens of this genus, showing that the unusually wet spring of 1937 was apparently very favorable for *Schizopus*, as it was also for *Scarabaeidae*.

Since both species are very similar structurally, it will be necessary to rely upon color to distinguish between them in the key to follow. As far as known there is no integradation in the coloration and, since it is the most readily discernible character, it will be freely used.

KEY TO SPECIES

- Pronotum dark brown to testaceous, femora brown to testaceous, elytra with humeral vittæ.....*sallei*
 Pronotum brilliant blue, green or cupreous-green, femora blue, green or cupreous-green, elytra without indication of humeral vittæ*laetus*

The writer wishes to express his gratitude to both Mr. Ferguson and Mr. Warren for two specimens of *sallei* and for information concerning the exact habitat from which they were taken.

STRATIOMYID FLY LARVAE IN HONEY BEES' NESTS

On February 1, 1939, Miss Nora K. Morres of the Santa Barbara Museum sent me some dipterous larvae which were invading a house from an old bees' nest which had been established in the chimney. Recently one of these emerged. It proved to be *Hermetria illucens* Linn., a European species, now well established here and there in this country.—Edwin C. Van Dyke.

THREE NEW SPECIES OF TINGITIDÆ (HEMIPTERA) FROM AUSTRALIA

BY CARL J. DRAKE

Iowa State College, Ames

The present paper contains the descriptions of three species of lace bugs from Australia. The types are in the Drake collection.

Cysteochila hackeri Drake, n. sp.

Head reddish brown, with five, short, testaceous spines. Antennæ yellowish brown, moderately long; segment one short, stouter and slightly longer than two; three long, slender, slightly more than three times as long as four. Rostrum long, dark brown, extending between hind coxæ; rostral channel narrow, open behind. Legs rather short, reddish brown, clothed with numerous pale, bristle-like hairs.

Pronotum concealed on each side by the reflexed and inflated paranota, the triangular process reticulate; collar faintly raised, reticulate; median carina moderately raised, uniseriate; lateral carinæ visible on triangular process, uniseriate, slightly divaricating posteriorly; paranota large, reflexed and inflated, concealing disc on each side of pronotum but not covering median carina, brown. Elytra grayish brown, some nervelets infuscate, constricted beyond middle; costal area very narrow, the areolæ very small, with several small black-fuscous spots; subcostal area biseriate, the areolæ large; discoidal area large, the nervure separating it from subcostal area curved and with a raised, black place a little before the apex, the areolæ rather large and five deep in widest part, the nervure between discoidal and sutural areas sharply raised. Length, 3.90 mm.; width, 1.00 mm.

Holotype, female, Melrose, Australia, A. M. Lea; paratype, Murray Bridge, and two paratypes, Parachilna Flanders Range, E. L. Savage.

The hair on legs and the raised nervure separating discoidal and sutural areas are distinguishing characters. It is very distinct from other members of the genus known to occur in Australia. *C. constantis* (Drake) is a larger species with higher paranotal cysts.

Dicysta cara Drake, n. sp.

Large, testaceous, some of the nervelets embrowned. Head brown, concealed by anterior cyst, the spines short, testaceous and

appressed. Bucculae not meeting in front. Rostrum long, brown, dark at tip, extending to end of sulcus. Antennae slender, testaceous; segment one long, three times as long as two; three long, twice as long as four. Legs long, slender, yellowish brown.

Pronotum convex, finely pitted, grayish brown, the lateral carinae wanting; paranota large, circular in outline, shaped like a shallow bowl, reflexed upright, testaceous, the nervelets embrowned. Hood large, high, rounded from above, testaceous; hind cyst large, narrowed at summit; foliaceous median carina arising a little below middle of hind margin of hood, sharply raised, slightly higher and attached to the summit of hind cyst. Elytra very broad, strongly widened at base, testaceous, widely reticulate, with large tumid elevations, the outer margin finely serrate; costal area very broad, with fine areolae in widest part. Length, 3.65 mm.; width, 2.40 mm.

Holotype (female), allotype (male) and eight paratypes, Maleny, Queensland, January 10, 1929, collected by H. Hacker. In some of the specimens the nervelets near the margin of elytra are considerably embrowned.

Dicysta parilis sp. nov.

Color, form, size and markings very similar to *D. cara* n. sp., but readily distinguishable by its large cysts of nearly equal size and the membrane connecting them which is not arched and not as high as the hind cyst. The cysts are also closer together. Other characters very similar to *D. cara*. Length, 3.65 mm.; width, 3.35 mm.

Holotype, female, Mackay, Queensland, June 10, 1932, collected by W. A. McDougall. This species and *D. cara* are very typical members of the genus *Dicysta* Champion and the first records of the genus in Australia.

CONTINENTAL DRIFT

Our Wandering Continents. Alexander L. Du Toit. Edinburgh: Oliver & Boyd, Ltd., 1937, pp. xii+366, 48 figs. 18 s net.

In this volume the author has brought together the evidence of Taylor, Wegener, van der Gracht, and others and has added materially to this from his own extensive researches on both sides of the Atlantic. The result is a comprehensive and convincing, although heterodox, picture of earth history which strikes at the very foundations of geology.

Du Toit meets problems squarely, answers criticisms, points out weaknesses on both sides of the question and, in general, has given us an excellent summary of one of the theories which may have profoundly influenced the distribution of insects.—R. L. Usinger.

AN OUTBREAK OF A NEEDLEMINER, EPINOTIA
MERITANA, IN WHITE FIR

(Lepidoptera, Olethreutidae)

BY DONALD DE LEON

E. M. N.

Berkeley, California

A heavy, localized outbreak of the needleminer (*Epinotia meritana* Heinrich) in white fir [*Abies concolor* (Gordon) Parry] was found by Junior Forester L. J. Farmer and the writer on Escalante Summit near Escalante, Garfield County, Utah, on June 10, 1937. Hitherto this species seems to have been known only from pine from Carbon County, Utah, and Victoria, B. C.

The needleminer was defoliating the fir on an area of about ten square acres. Defoliation had apparently been going on for four or five years, and many of the trees were practically dead. The foliage of the more recently infested trees was very thin and much that remained had a scorched appearance. Although trees of all age classes were infested, the heaviest defoliation was of trees of middle age.

Both the larval and pupal stages of the insect were present. The larvæ usually construct a loose web around several needles and, at the time of observation, both the larvæ and the pupæ were found chiefly in the needles which had separated from the twigs but were held hanging to them by this web. There were also many empty mined needles so held, as well as mined but abandoned needles covering the ground. Needles mined by what were apparently first instar larvæ generally remained fast to the twig without being held by any webbing; some of these needles had died completely even though only partly mined, while others had died in the mined area only, which, in the early stages, is confined to the distal half of the needle.

The larvæ are about 8 mm. long, greenish in color, with a brownish head and a nearly black, sagittally separated, sclerotized area on the caudal two-thirds of the pronotum. Some of the larvæ, however, had a lighter colored sclerotized area on the pronotum but it is probable that they had but recently moulted. The pupæ, which were found only in the needles, are about 6 mm. long and dark brown. The abdomen is somewhat lighter than the rest of the insect. The dorsa of abdominal segments three to seven are provided each with a transverse row of small spines one-third the distance from the anterior and posterior margins respectively. The spines of the posterior row are smaller and more numerous

than those of the anterior row. Abdominal segments two and eight have the dorsa each with a single row of spines but the row on segment two is composed of the finer sized spines and the row on segment eight of the larger sized spines. The dorsa of abdominal segments one and nine lack spines and the terminal segment is furnished with a row of four to five spines which are larger than those on the other segments. Emergence of the moths from material collected occurred previous to July 8, 1937.

The moths are grayish, mottled with nearly black scales some of which have a metallic luster. The mottling is heavier at the basal and apical thirds of the wing. The hind wing is leaden gray.

Larvæ that were no doubt of this species were common throughout the near-by Bryce Canyon National Park, Utah, during the latter part of May and June, 1937. In no place were there signs of an outbreak but, because of what is happening outside of the park, this insect should be considered a potential threat to the stands of white fir within the park. Larvæ and pupæ were found in the park as late as June 24, 1937. Pupæ were present in needles of both 1935 and 1936 growth.

This species was described in 1923 in Bulletin 123 of the U. S. National Museum by Heinrich, who states that the material he received was reared by Herbert J. Peck, from Carbon County, Utah, where the larvæ were mining the needles of pine. The moths were reported to have issued in May and June, 1921. Other specimens were received from Victoria, B. C.

Acknowledgments are made to Mr. H. H. Keifer of the California State Department of Agriculture, Sacramento, who kindly determined this species.

OBITUARY

Notice has recently been received of the death, on January 11, 1939, of B. Preston Clark at the age of 79 years. While amassing the largest collection of Sphingidae in the world, Dr. Clark generously augmented the principal collections of hawk moths of this country from his extensive series. With this assistance the collection of Sphingidae of the World in the California Academy of Sciences now numbers 334 species.

Dr. Clark has likewise turned over a considerable amount of material in other orders to western collections from the incidental material picked up by his collectors, particularly by J. August Kusche.—R. L. Usinger.

THE HINDS COLLECTION OF THYSANOPTERA

BY STANLEY F. BAILEY

University of California, Davis

About 35 years ago the students of the order Thysanoptera in North America could be counted on one hand. At the time that the late W. E. Hinds published his monograph of the order (1902) he was the leading taxonomist in this group of insects. Following the appearance of this paper an increased interest was shown in the taxonomy of thrips, at least judged by the miscellaneous papers which were published by Franklin (1903-09), Daniel (1904), Shull (1909), D. L. Crawford (1909-10), Back (1912), P. R. Jones (1912), and Morgan (1913-1929), later followed by articles from Treherne (1918-19) and Mason (1922-26). In addition to these workers there were three others who have been the leaders, namely Hood (1908-) and Moulton (1907-), who have been publishing for about 30 years, and Watson, whose papers have appeared since 1913, or 25 years.

In more recent years in the wake of Priesner's monograph on the Thysanoptera of Europe (1926-28), articles by Steinweden (1930-33), Watts (1934-35), Andre (1936), J. C. Crawford (1938) and the writer (1931-) have been published on thrips. At the present time there are known to the writer at least 12 students of this group of insects who are collecting, studying, publishing, or contemplating publishing on North American Thysanoptera. Without a doubt as time goes on there will be more taxonomists in this group. Therefore, anything that can be done to facilitate the work is to be encouraged. This can be done by clearing up the synonymy of the older species and illustrating them by means of improved optical equipment as well as making available for study the types of various scattered collections.

For these reasons, during the past summer the writer visited Amherst, Massachusetts, to study and catalog the Hinds collection, deposited at the Department of Entomology of Massachusetts State College¹. Hinds stated in his monograph (page 80), "Of the new species described in this paper, a complete set of types has been deposited in the Massachusetts Agricultural College;

¹ This study was made possible through the kindness of Prof. C. P. Alexander.

a set of cotypes, so far as they exist, has been deposited in the United States National Museum; a third set of cotypes I have retained for my own use, and the remainder I have also deposited in the Massachusetts Agricultural College."

In correspondence with the writer (December, 1935) Hinds stated that his own collection was lost by fire in 1926. As far as is known to the writer, the specimens sent to Washington, D. C., have been incorporated with those of Pergande, Morgan, and Franklin in the rapidly growing collection of thrips under the direction of the Taxonomic Division of the Bureau of Entomology and Plant Quarantine. In addition to the specimens collected and mounted by Hinds himself, were those he obtained from Franklin, D. L. Crawford, Beach and Hooker. Through the efforts and generosity of J. D. Hood and J. C. Crawford many additional specimens have been added in recent years to the original Amherst collection, which now totals about 95 species. For the benefit of those interested in Thysanoptera and to identify the original Hinds' collection as an important taxonomic entity, a complete list of the specimens is here presented.

The following new species² were described by Hinds:

- **Aeolothrips bicolor*—6323
- Chirothrips crassus*—6324
- Chirothrips obesus*—6325
- Limothrips avanæ*—6326
- Sericothrips cingulatus*—6327
- **Euthrips fuscus*—6328
- Euthrips nicotianæ*—8434
- **Rhaphidothrips fuscipennis*—6329
- **Heliothrips fasciapennis*—6330
- Trichothrips ambitus*
- Trichothrips beachi*
- Cephalothrips yuccæ*—6331
- Phloeothrips uzeli*—6332
- **Phloeothrips pergandei*
- Acanthothrips magnafemoralis*
- Malacothrips zonatus*—6333
- Eurythrips ampliventralis*—6334
- Eurythrips osborni*—6335
- **Cryptothrips aspersus*—6336

It is indeed fortunate that all (labelled "cotype" or "meta-

² N. B.: No attempt is made here to discuss the validity of Hinds' species or the synonymy of any species in the collection.

type") but two, *Chirothrips obesus* and *Trichothrips ambitus*, are still present. However, it should be noted that the species marked with asterisks above are represented by such badly mutilated or poorly mounted specimens as to render a study of their characters very difficult and in some cases impossible. The numbers refer to the catalog number in the U. S. National Museum. Since *T. ambitus* was described from a unique female it is the only Hinds species that is lost and unavailable for study.

Other specimens, many of which are types, present in the original collection are listed below:

Anaphothrips longipennis D. L. Crawford
Anaphothrips striatus Osborn, homotype
Ctenothrips bridwelli Franklin, cotype
Euthrips cephalicus D. L. Crawford
Euthrips insularis Franklin, paratypes and cotypes
Euthrips minutus Moulton
Heliothrips rubrocinctus (Giard)
Heterothrips decacornia D. L. Crawford
Sericothrips variabilis (Beach) homotypes
Thrips abdominalis D. L. Crawford
Thrips perplexus Beach, homotype
Aleurodothrips fasciapennis Franklin, cotype
Anthothrips gowdeyi Franklin, paratypes and cotypes
Anthothrips niger (Osborn), homotype
Anthothrips variabilis D. L. Crawford
Cryptothrips fasciapennis Franklin, type
Idolothrips angusticeps D. L. Crawford
Liothrips bakeri D. L. Crawford
Trichothrips niger Franklin, type

An obituary of W. E. Hinds has appeared under the pen of F. L. Thomas (Jour. Econ. Ent., 29:225-226, 1936) and the writer published a note in THE PAN-PACIFIC ENTOMOLOGIST (Vol. 14, page 96) on the chime dedicated to Doctor Hinds.

Of the more than one hundred publications credited to him, as far as is known, he published only three papers on Thysanoptera which are cited below:

1900. The grass thrips, *Anaphothrips striatus* (Os.), 37th An. Rpt. Mass. Agr. Col., Public Document No. 31, Jan., pages 83-97, 4 plates.
1902. Contribution to a monograph of the insects of the order Thysanoptera inhabiting North America. Proc. U. S. Nat'l Museum, 26:79-242 (No. 1310), 11 plates.
1905. A new tobacco thrips. Proc. Biol. Soc. Wash., 18:197-200.

A NEW SPECIES OF PSEUDOMETHOCA FROM ARIZONA

(Hymenoptera-Mutillidæ)

BY ARCHIBALD H. CALDWELL, JR.

*Phoenix, Arizona**Pseudomethoca sacatona* Caldwell, new species

Female: Length 19 mm. Ferruginous, head ferruginous, front and vertex clothed with fiery-red pubescence and sparse, erect similarly colored hair, genæ clothed with sparse, semi-erect, silvery pubescence; front and vertex rugoso-punctate, the genæ with close, strong, confluent punctures; mandibles tridentate; antennæ separated at base by a distance equal to half length of scape; length of pedicellum equal to half length of first segment of flagellum; eyes large and slightly ovate, the distance between hind margins of eyes and postero-lateral angles slightly greater than longitudinal diameter of eyes; longitudinal carina of genæ strong and sharp; relative widths of head and thorax 1-1.

Thorax dark ferruginous; about as long as wide; dorsum of thorax rugoso-punctate extending over the edge of propodeum; posterior face of propodeum sparsely punctured with large separate punctures amongst which are finer punctures, less so caudad; dorsum of thorax clothed with fiery-red pubescence and sparse erect pubescence of the same color; posterior face of propodeum with long, sparse black hairs; humeri rounded, cephalic margin of propleura with sharp carina; propleura punctate; mesepisternum finely rugose and punctate; mesepimeron with large confluent punctures on the caudal margin; metapleura smooth and shining; sides of propodeum smooth and shining with a few sparse punctures medially and rugose-punctate on the caudal margin.

Abdomen ferruginous; first segment completely sessile with second; first tergite with close, confluent punctures and sparse, long, erect, black hairs and a band of black, recumbent, bristle-like hairs at apex and with silvery recumbent hairs laterally; second tergite with close, confluent punctures, clothed with silvery pubescence narrowly at sides, the remainder of the tergite with thick, appressed, fiery-red pubescence and sparse erect hairs of the same color, the median seven-eighths of apex with a narrow band of black recumbent pubescence, the remaining space on either side of apex with recumbent silvery pubescence merging into the silvery pubescence of the sides; tergites three to five closely punctate with a recumbent band of silvery pubescence on each entire apical margin, clothed with black, sparse, erect hairs making an erect fringe along the cephalic margin of each silvery band; tergite six with copper colored pubescence; pygidial area distinct, finely rugose; second sternite with large, elongate, separated punctures, and with a sparse, silvery pubescence at apex; sternites three to five sparsely silvery pubescent at apex. Legs dark ferruginous, clothed with long, sparse, silvery pubescence; calcaria pale.

Holotype, female, No. 4793, Cal. Acad. Sci., Ent., June, 1927, Sacaton, Arizona. Paratypes, two females, June, 1927, Sacaton, Arizona, in the author's collection.

This species keys to *P. flammigera* Mickel in his key in "The revision of Mutillid Wasps," Proceedings of the United States National Museum, Volume 64, Art. 15, p. 6, but has the following differences according to Mickel's description: the size of the insect and the posterior face of the propodeum sparsely punctured with large separate punctures amongst which are finer punctures, less so caudad; the median seven-eighths of the apex of the second tergite with a narrow band of black recumbent pubescence, the remaining space on either side of the apex with recumbent silvery pubescence merging into the silvery pubescence of the sides; tergites three to five closely punctate with each entire apical margin with a recumbent band of silvery pubescence as well as black, sparse, erect hairs making an erect fringe along the cephalic margin of each silvery band.

THE MANDIBLES OF OMUS DEJEANI RCHE. AS SECONDARY SEXUAL ORGANS

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(Coleoptera, Cicindelidæ)

BY ROBERT Y. PRATT

Coupeville, Washington

On May 2, 1938, while collecting on Whidby Island, Washington, I discovered two *Omus* (*Megomus*) *dejeani* Reiche under a piece of wood, mating. The male was on the back of the female, clasping her with his powerful, well developed jaws in the constriction between the pronotum and the elytra. Only the posterior pair of legs of the male were resting on the ground. This is also true in the case of *Tetracha carolina* (L.) and has been described in several species of *Cicindela*.¹

These two *Omus dejeani* were first discovered, in the act of mating, at 5:49 p. m. They were placed in a covered box and were found, still attached to each other, at 10:02 a. m. on May 3. They readily separated when disturbed at that time, but at 9:57 p. m. the previous evening, after four hours and eight minutes of observed mating, the male did not attempt to change his posi-

¹ Balduf, Walter Valentine, The Bionomics of Entomophagus Coleoptera, John S. Swift Co., Inc., p. 5, 1935.

tion when the female was turned over for an instant, placing the male on his back with the female on top of him. The female, when disturbed, would seek shelter, carrying the male with apparently no inconvenience. I do not know how long the pair had been mating when first found or how long they would have remained in that state if undisturbed, but the total observed period of mating was sixteen hours and thirteen minutes. The position of the jaws of the male *Omus dejeani* was not observed at 10:02 a. m. on May 3. They may or may not have been clasping the female at that time. Further research along this line would be interesting.

NOTE ON SILPHA (THANATOPHILUS) COLORADENSIS WICKHAM

Silpha coloradensis was described by Wickham (Can. Ent., XXXIV, p. 180, 1902), from a single male from Argentine Pass, near Georgetown, Colorado, at an elevation of over 12,000 feet. He later (Bull. Lab. Nat. Hist. St. Univ. Iowa, V, p. 274, 1902), reported a second specimen from Gunnison, Colorado, and there are a male and female in the Hatch collection from Manitou in the same state. Portevin, misinterpreting the original description (Portevin, Encycl. Ent., VI, p. 43, 1926; Hatch, Jour. N. Y. Ent. Soc., XXXV, p. 346, 1927 and Col. Cat. 95, p. 85, 1928), redescribed the species as *obalskii* (Portevin, Bull. Mus. Hist. Nat. Paris, p. 507, 1920; Encycl. Ent. VI, p. 50, fig. 45, 1926), on the basis of a series of specimens from British Columbia.

In view of the rarity of the species and the absence of any information on its habits, it is here noted that Frances Bjorkman took a series of six specimens at Independence Pass, Colorado, at an altitude of more than 12,100 feet in a can of old coffee grounds on July 9, 1938 and a second series of four specimens at Spring Creek Pass, Colorado, at an altitude of more than 11,000 feet in a sheep carcass on July 19, 1938. On both occasions *coloradensis* was associated with individuals of *Silpha* (*Thanatophilus*) *lapponica* Herbst, a widely distributed carrion-inhabiting species. Specimens have been placed in the Hatch collection at the University of Washington.—Frances Bjorkman and Melville H. Hatch, Department of Zoology, University of Washington.